

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-023379

(43)Date of publication of application : 29.01.1999

(51)Int.Cl.

G01K 7/22

G01K 7/00

(21)Application number : 09-190595

(71)Applicant : AISIN AW CO LTD  
TOYOTA MOTOR CORP  
YAZAKI CORP

(22)Date of filing : 30.06.1997

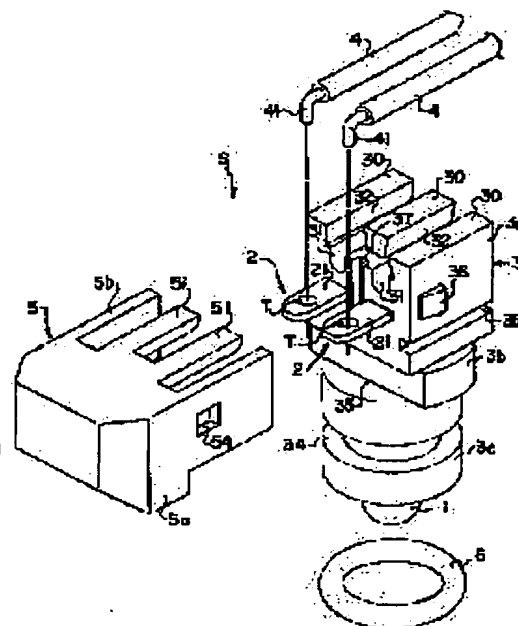
(72)Inventor : MORISHITA TOSHIYA  
KOMATSU KATSUTOSHI  
FUKATSU AKIRA  
MAE TOSHIYUKI  
SUZUKI KATSUHIRO  
MIYATA HIDEKI  
FUKUHARA TOSHIAKI

## (54) TEMPERATURE SENSOR

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To obtain a temperature sensor whose body is clamped so as to be fixed to an apparatus without applying a load to a cover and which can be used for a long period in a stable state.

**SOLUTION:** In a temperature sensor S, the head part 3a of its body 3 is provided with wire fixation grooves 31 to which lead wires 4 are fitted, a cover 5 is provided with wire cover parts 51 which are fitted to the wire fixation grooves 31 and which cover the lead wires 4, and the head part 3a of the body 3 is provided with exposure faces 30 exposed from the cover 5 in parts other than parts covered with the wire cover parts 51. The exposure faces 30 are used as load support faces by which a load applied to the temperature sensor 3 is transmitted to a fixation jig to an apparatus.



## LEGAL STATUS

[Date of request for examination]

29.09.2000

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

3325207

[Date of registration]

05.07.2002

\* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

CLAIMS

---

[Claim(s)]

[Claim 1] In the becoming temperature sensor it inserts in a body equipped with the terminal connected to the thermos sensor and this thermos sensor, the lead wire connected to said terminal, and said body -- having -- at least -- the connection of a terminal and lead wire -- wrap covering -- since -- Said body has the wire fixed slot which inserts lead wire in the head. Said covering It is the temperature sensor characterized by having the exposed surface which has the wrap wire covering section and exposes from covering the lead wire inserted in a wire fixed slot to the part except the head of said body being covered with the wire covering section.

[Claim 2] It is the temperature sensor according to claim 1 which said wire covering section is fixed to a wire covering section fixed slot in the shape of a dovetail, and escapes from and carries out the stop of the lead wire by said body's making a wire fixed slot the inside, and having a wire covering section fixed slot on the outside.

[Claim 3] Said wire fixed slot is a temperature sensor according to claim 1 or 2 which has the shaft-orientations shear-connector means which crushes locally the lead wire inserted in this wire fixed slot in the direction of a path.

[Claim 4] Said body is a temperature sensor according to claim 1, 2, or 3 which has the fitting slot of the fastener fixed to a device at the flank.

---

[Translation done.]

**\* NOTICES \***

**JPO and NCIPi are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to anchoring to the device of a temperature sensor, and the \*\*\*\*\* technique of the lead wire about a temperature sensor.

[0002]

[Description of the Prior Art] Conventionally, it is included in an engine, an automatic transmission, etc. which are carried in a car, and there is a temperature sensor which uses a thermos sensor as a thermistor as a temperature sensor which detects an oil temperature for the control. When taking out the detected signal through lead wire in this kind of temperature sensor, generally The mould of the terminal of a couple which connected the end with the thermistor on the two poles, respectively is carried out into resin by insert molding, and a body is constituted. The other end of the terminal of a couple It considers as the condition of having made it exposing from a body, and drawing of a signal is made possible with the lead wire which connected the head to the outcrop of these other ends, and in order to prevent mixing of the foreign matter to a connection, a wrap configuration is taken in a connection with covering inserted in the body.

[0003] Since connection resilience tends to fall by degradation with the passage of time, even if tensile force acts on lead wire, it must be made, as for the soldering section, for it not to have to act on the soldering section in such a temperature sensor, although the other end of a terminal and the head of lead wire are connected by soldering. So, with the technique of the disclosure to JP,5-36330,U, as shown in drawing 7, the slot d which has Flection c is formed in the flank b of the body a of a sensor, and the configuration which Slot d is made to carry out fitting of the lead-wire e, and prevents an operation of the tensile force to the soldering section by gap in the shaft orientations of lead-wire e by external force is taken. In detail, Flection c was made into the gestalt which shifts a part of axis of lead-wire e horizontally to parallel, enlarged coat of lead-wire e, and frictional resistance between Slots d, and has prevented the gap in shaft orientations. Furthermore, in this temperature sensor, in order to prevent the blank from the slot d of lead-wire e, the near whole body a surface in which lead-wire e was inserted is considered as the wrap configuration with covering.

[0004] When detecting [ for example, ] the oil temperature of an automatic transmission by using the temperature sensor of such a configuration as an oil-temperature sensor, it is fixed to a valve body by the clamp made from the spring steel of dedication, and a temperature sensor is arranged so that the ambient temperature inside an oil pan mechanism may be detected. In that case, a clamp will support the body and covering of a temperature sensor.

[0005]

[Problem(s) to be Solved by the Invention] By the way, when using the above temperature sensors for detection of the oil temperature in the oilway of a valve body, in order that direct oil pressure may act on a temperature sensor unlike the above-mentioned activity gestalt, a big load is applied to the clamp section of covering weaker than a body in reinforcement, and a problem arises in the endurance of covering.

[0006] Then, this invention sets it as the 1st object to fix to a device in the condition of having been stabilized for a long period of time, without covering a load over covering by the clamp of only a body, and to offer an usable temperature sensor.

[0007] Next, although the stop of the lead wire will be pressed down, escaped from and carried out to a slot in the partial covering section in order to expose a body from covering when taking the configuration which clamps only a body so that a load may not be covered over covering, it becomes difficult to escape, if it is made such, and to strengthen a stop.

[0008] Then, this invention sets it as the 2nd object to carry out fitting of the covering section which covers,

escapes from and carries out the stop of the lead wire to a body firmly, and to ensure the omission stop of lead wire.

[0009] Moreover, although it is desirable that it is a small light weight as for the temperature sensor built into a device, since it will form Flection c in the slot which the lead wire by the above-mentioned Prior art shifts [ slot ], and carries out fitting of the lead wire with a stop configuration, it will need the width of face and die length corresponding to it for the slot formation side face of Body a. Therefore, this configuration is not suitable for adoption to the sensor which made the body small.

[0010] Then, this invention sets it as the 3rd object to prevent a gap in the shaft orientations of lead wire using a slot forming face small by that cause, without making a slot crooked.

[0011] By the way, by having to use the clamp of a special configuration depending on an installation part as it is what can take only the single clamp approach, when building a temperature sensor into a device, even if the sensor itself is small, the inconvenience which needs the big monopoly tooth space for a clamp produces it.

[0012] Then, this invention sets it as the 4th object to give versatility to a temperature sensor as immobilization to a device being possible in a temperature sensor by two sorts of clamp approaches that formats differ.

[0013]

[Means for Solving the Problem] The body with which this invention is equipped with the terminal connected to the thermos sensor and this thermos sensor in order to attain the 1st object of the above, In the becoming temperature sensor it inserts in the lead wire connected to said terminal, and said body -- having -- at least -- the connection of a terminal and lead wire -- wrap covering -- since -- said body It is characterized by having the wire fixed slot which inserts lead wire in the head, and having the exposed surface which exposes from covering the lead wire which inserts said covering in a wire fixed slot to the part except having the wrap wire covering section and the head of said body being covered with the wire covering section.

[0014] Next, in order to attain the 2nd object, said body makes a wire fixed slot the inside, it has a wire covering section fixed slot on the outside, and it is fixed to a wire covering section fixed slot in the shape of a dovetail, and said wire covering section is considered as the configuration which escapes from and carries out the stop of the lead wire.

[0015] Furthermore, in order to attain the 3rd object, said wire fixed slot is considered as the configuration which has the shaft-orientations shear-connector means which crushes locally the lead wire inserted in this wire fixed slot in the direction of a path.

[0016] Next, in order to attain the 4th object, said body is considered as the configuration which has the fitting slot of the fastener fixed to a device at the flank.

[0017]

[Function and Effect of the Invention] With the temperature sensor according to claim 1 which takes the above-mentioned configuration, since an exposed surface is in the head of a body, immobilization to a device can be enabled by pressing down this exposed surface with a proper fastener, without giving a load to covering. Therefore, according to this invention, the endurance of a temperature sensor is raised and it becomes detectable [ the oil temperature stabilized over the long period of time ].

[0018] Next, with a configuration according to claim 2, since the wire covering section is fixed to the wire covering section fixed slot on the body in the shape of a dovetail, the wire covering section which covers a body selectively can certainly be fixed to a body, lead wire is pressed down by that cause, it escapes certainly and a stop is carried out.

[0019] Furthermore, with a configuration according to claim 3, since the shaft-orientations shear-connector means which crushes lead wire in the direction of a path locally is formed in the wire fixed slot, it can carry out without making the wire fixed slot in which it is inserted for eye a shear connector of lead wire crooked, and, thereby, the wire fixed slot forming face of a body can be made small.

[0020] Furthermore, with a configuration according to claim 4, since the fitting slot on the fastener is established also in the body flank besides the exposed surface of the above-mentioned head of a body, although a temperature sensor is fixed to a device, the method which presses down the head of a body, and the method which inserts a proper fixed means in the fitting slot of a body flank can be chosen, and, thereby, the versatility of a temperature sensor can be raised to it.

[0021]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained along with a drawing. Drawing 1 is what is shown with the perspective view which disassembled the temperature sensor

concerning an operation gestalt. This sensor S The body 3 by which the mould was carried out by insert molding in the thermos sensor 1 which builds in the thermistor which is not illustrated, and the tabular terminals 2 and 2 (writing together of the sign of a member which makes a pair is omitted hereafter) of a couple connected to the two poles of the thermistor of a thermos sensor 1, respectively, it connects with an outcrop 21 from the body 3 of each terminal 2 -- similarly it is inserted in the lead wire 4 of a couple, and a body 3, and the connection T of the ends child 2 and both the lead wire 4 mainly consists of wrap coverings 5.

[0022] According to this invention, a body 3 has the wire fixed slot 31 which inserts the lead wire 4 of each other in the head 3a in parallel. On the other hand, covering 5 has the wrap wire covering section 51 for the lead wire 4 inserted in the wire fixed slot 31. With this gestalt, the wire covering section 51 will be made into the configuration which extends in the shape of a ctenidium on the top face of covering 5, and will have the exposed surface 30 exposed to the part except head 3a of a body 3 being covered with the wire covering section 51 from covering 5 by that cause.

[0023] Furthermore, a body 3 has the wire covering section fixed slot 32 on the outside by making the wire fixed slot 31 into the inside. And it is fixed to the wire covering section fixed slot 32 in the shape of a dovetail, and the wire covering section 51 is considered as the configuration which escapes from and carries out the stop of the lead wire 4. That is, the ctenidium-like wire covering section 51 sees them in a cross section, and is made into the shape of solar plexus in which the bottom spreads, and the wire covering section fixed slot 32 is made into the dovetail groove of the cross section where the flute width spread inside so that it may correspond to the cross section of the wire covering section.

[0024] Furthermore, the wire fixed slot 31 has the shaft-orientations shear-connector means which crushes locally the coat of the lead wire 4 inserted in them in the direction of a path. It shifts, and the concrete configuration of a stop means is shown, and drawing 2 shifts [ this ] in this case, and let the stop means be the serrate thing which made the both-sides wall of the wire fixed slot 31 project two or more edge section 31a face to face. Even if the tensile force of the direction of a graphic display arrow head acts on lead wire 4 by this, the load of the force is not carried out to the connection T by direct soldering.

[0025] And a body 3 has the fitting slot 33 of the fastener fixed to a device at the flank (a concrete location is explained later) which is not covered with the covering 5. Let the fitting slot 33 be the concurrency slot of the configuration which cuts and lacks a body 3 with this gestalt.

[0026] Furthermore, a detailed description of each part constitutes the body 3 from shank 3c of the shape of a cylinder inserted in the fitting hole of a device, head 3a of the letter of a square shape block, and flange 3b that becomes a positioning means with an anchoring device among them. The dome-like thermos sensor 1 is formed at the head of shank 3c for a minor diameter and a head from shank 3c, and the fitting slot 34 of O ring 6 is formed in the medium of shank 3c. Moreover, flange 3b constitutes the fitting slot 33 as for which considered as the configuration which has 2 surface width with the gestalt which cut some disks in parallel and lacked it, and this 2 surface-width part carried out the reentrant to shank 3c and head 3a relatively. The slot 35 in which the flange 52 (refer to drawing 3 ) jutted out inside is inserted is formed in the both-sides side lower part of head 3a from the both-sides wall of covering 5, a rectangle inserts each other in a center section, and the projection 36 is formed in it. Furthermore, the fluting 37 in which the septum covering 5 carries out [ a septum ] a postscript is inserted is formed in the end face of the side which a terminal 2 exposes.

[0027] The part in which a wrap part is inserted in the body 3 which is set to box-like section 5a, and stands in a row in it in Connection T is set to \*\*\*\*\*5b which the front and a lower part opened by being shown at the 1 side of head 3a of a body 3 to spite so that covering 5 may combine, refer to and understand the center-section horizontal section shown in drawing 3 . The septum 53 is formed in box-like section 5a with the gestalt which bisects the interior perpendicularly, and the head of a septum 53 is carrying out termination in the location which fits into said fluting 37 of a body 3. Said window hole 54 into which it inserts each other in and projection 36 fits is formed in the both-sides wall of covering 5. The upper wall of covering 5 is made into the shape of a ctenidium as mentioned above except for box-like section 5a. In addition, the radius of circle is attached at the head of the wire covering section 51 made into the ctenidium in the form where the angle by the side of an underside is dropped so that the coat of lead wire 4 may not be damaged.

[0028] The temperature sensor which consists of each above-mentioned element inserts both the lead wire 4 in the wire fixed slot 31, bends the lead-wire part 41 which removed the coat of lead wire 4, and is inserted and soldered to the hole of a terminal 2. And covering 5 is inserted in a body 3 so that the soldered connection T may be covered. this time -- the flange 52 fang furrow 35 of the lower part of covering 5 -- the wire covering section 51 -- the wire covering section fixed slot 32 -- the point of a septum 53 -- a fluting 37

-- moreover, it inserts in each other's window hole 54, fitting is carried out to projection 36, respectively, and a body 3 and covering 5 are unified. In addition, O ring 6 is inserted in the fitting slot 34 as a periphery seal of shank 3c.

[0029] Using the above-mentioned configuration, temperature sensor S is fixed to a device with two different gestalten, as shown in drawing 4 or drawing 5. First, by the fixed approach shown in drawing 4, shank 3c is inserted so that only the thermos sensor 1 of temperature sensor S may project in Oilway L in the fitting hole H which was able to be opened in the wall surrounding the oilway L of a device, the field of the arbitration of the components F which are concurrent with a sensor anchoring side in the condition is used, and the fixed approach of holding down the exposed surface 30 of head of body 3a of temperature sensor S is taken. The oil pressure concerning Sensor S is supported by Components F through a body 3, and a load can be prevented from starting covering 5 by that cause according to this fixed approach. In addition, in drawing, although it emphasizes and it is indicated that the exposed surface 30 from the covering 5 of head of body 3a is substantially projected from the top face of covering 5, if it is made for an exposed surface 30 not to become below the top face of covering 5 in consideration of a manufacture error, it is sufficient for this amount of projection, and, thereby, the load-bearing function by the exposed surface 30 is attained.

[0030] Next, by the approach shown in drawing 5, the approach of fixing a push in and the keeping plate P to a device by a bolt B stop etc. so that flange 3b may be put between the fitting slot 33 (refer to drawing 1) which consists of said 2 surface width of temperature sensor S in which shank 3c was similarly inserted by the fitting hole H for two crotches of the keeping plate P which used the head as two crotches is taken. Shank 3c is supported by two crotches of the keeping plate P, and a load can be prevented from the oil pressure concerning Sensor S specifically starting covering 5 by that cause through a body 3 also by this approach at the keeping plate P.

[0031] Finally, the example of application which materialized the object for anchoring further is explained. In this case, a temperature sensor is built into the change gear case C of an automatic transmission as shown in drawing 6. Temperature sensor S is attached in the discharged oil way which stands in a row in the discharge side of the lubricating oil pump which is not illustrated that the oil temperature of the oilway L in the valve body V of an automatic transmission should be detected in this example. And temperature sensor S is inserted in the valve body V which was fixed under the change gear case C and covered by the oil pan mechanism P in the state of a handstand, and is being fixed in the condition of pressing down a head from the bottom, by using as a fastener the strainer F attached in the valve body V bottom. In this way, the inside of an oil pan mechanism P is led to the attached lead wire 4 of temperature sensor S to the wire connector N, and it is connected to the socket inside [ case ] the wire connector N fixed to Case C so that the change gear case C might be penetrated there. The wire harness W connected with the electronic control (ECU) of an automatic transmission is connected to the socket of the wire connector N of a change gear case outside. In this way, the transfer to an electronic control (ECU) of the oil-temperature signal which temperature sensor S detects is enabled as an electrical signal. In addition, let the detection oil temperature in this case be the information for getting to know the viscosity of automatic-transmission hydraulic oil (ATF) required for automatic gear change control.

[0032] As explained in full detail above, since an exposed surface 30 is in head 3a of a body 3, by pressing down an exposed surface 30 with a proper fastener, immobilization to a device can be enabled without giving a load to covering 5, and thereby, the endurance of temperature sensor S is raised and it becomes detectable [ the oil temperature stabilized over the long period of time ] at this temperature sensor S. Furthermore, since the fitting slot 33 on the fastener is established also in the body flank besides the exposed surface 30 of head of body 3a, although temperature sensor S is fixed to a device, the method which presses down head 3a of a body 3, and the method which inserts a proper fixed means in the fitting slot 33 of a body flank can be chosen, and, thereby, the versatility of temperature sensor S can be raised to it.

[0033] as mentioned above, although this invention was explained in full detail based on 1 operation gestalt, it cannot be overemphasized that many things are looked like [ a claim ] within the limits of the matter of a publication, and the concrete configuration of details can be changed and can be carried out, without limiting this invention only to the content of disclosure of the above-mentioned operation gestalt.

---

[Translation done.]

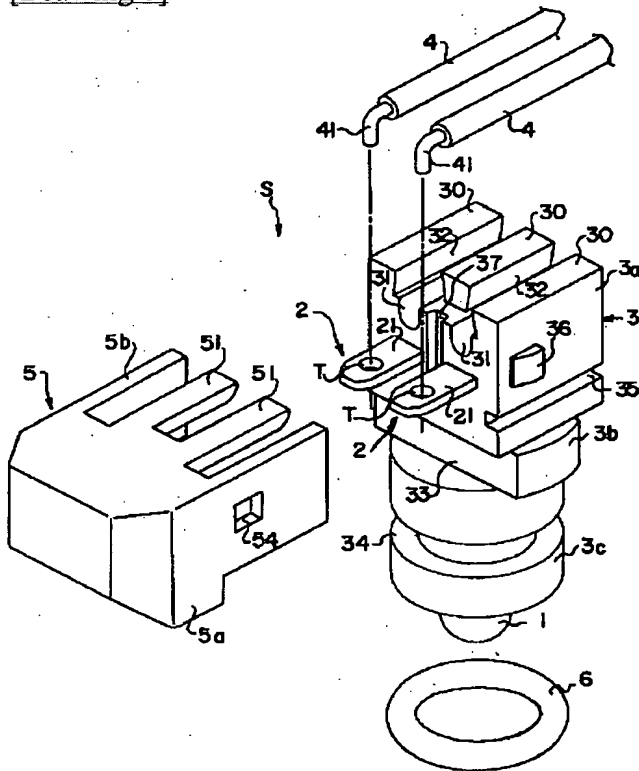
## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

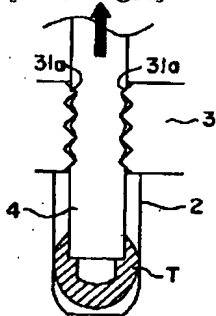
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DRAWINGS

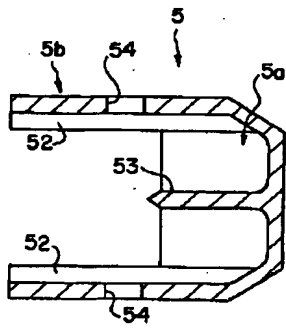
[Drawing 1]



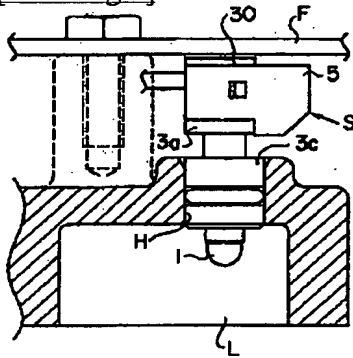
[Drawing 2]



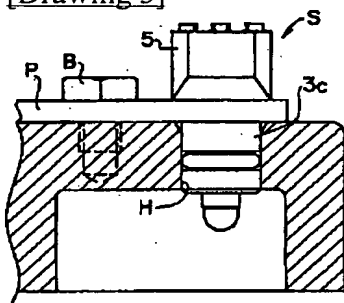
[Drawing 3]



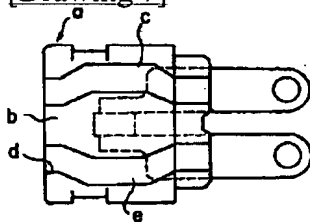
[Drawing 4]



[Drawing 5]

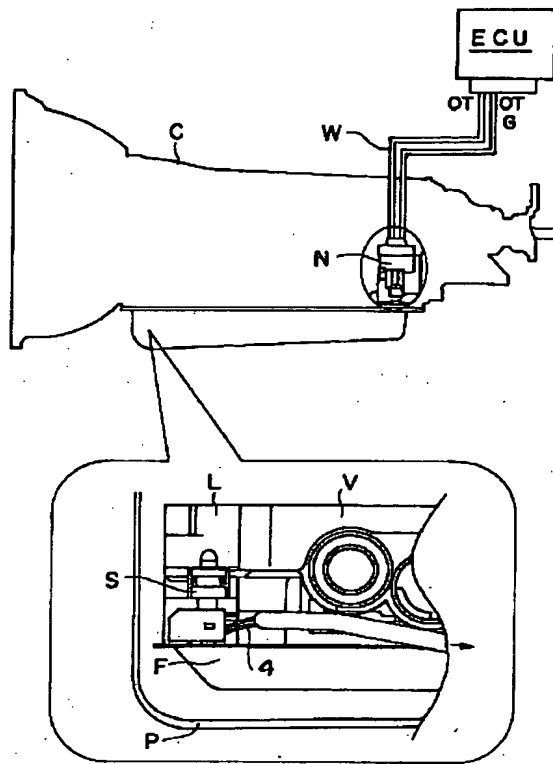


[Drawing 7]



[Drawing 6]





---

[Translation done.]